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Scours in Buffalo Calves

By

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AGE INCIDENCE

When our attention was first brought to this disease (June, 1944) we were told by all farm managers consulted that the majority of deaths were occurring in animals about one month old. This proved to be quite wrong. A total of 283 consecutive calves born on various farms in this area were kept under observation by us for 14 days after birth. The ages at which deaths occurred are shown in Table I.

TABLE I

SHOWING THE AGES AT WHICH DEATHS OCCURRED IN BUFFALO CALVES DURING AN OUTBREAK OF CALF SCOURS

	Age at death in days													Survived 14 days or over
	1	2	3	4	5	6	7	8	9	10	11	12	13	
No. dying	28	38	24	13	20	16	12	15	8	9	9	8	4	79
Percentage	9·9	13·4	8·5	4·6	7·1	5·7	4·2	5·3	2·8	3·2	3·2	2·8	1·4	27·9

It may be seen that 151 calves (53·4 per cent.) died within seven days of birth and that only 79 (27·9 per cent.) survived for 14 days or more. It was quite erroneous therefore to state that the majority of deaths were occurring in calves about one month old.

AETIOLOGY

Under the heading of "Calf Scours" there appear to be at least three distinct aetiological conditions.

It had been the local opinion that rinderpest was the cause of the deaths and anti-rinderpest serum had been given without noticeable effect. It was at this stage that we were called in to investigate.

On the assumption that the deaths were mainly occurring in month-old calves, six calves of this age showing symptoms of scours were examined. Blood smears showed no evidence of parasites; but there was usually an increase in the percentage of polymorphs. Faeces showed no evidence of helminths or protozoa but red and white blood cells and desquamated epithelial cells were present in large numbers. From the mesenteric glands of five of these animals *S. dublin* was isolated and it seemed likely therefore that this organism was responsible for the scours.

When it became evident that the deaths were occurring in much younger animals a number of these were examined bacteriologically. Salmonella organisms, resembling *S. typhi-murium*, were isolated from 76 of the 124 calves examined. In no case was *S. dublin* isolated. A closer examination of the results showed a definite relationship between the time of survival of the calf and the likelihood of isolating salmonella organisms. Table II shows this quite clearly. It may be seen that of the 42 calves that died within two days of birth only 12 (28·6 per cent.) were salmonella positive, whereas 64 (78·0 per cent.) of the 82 that died when over two days old were positive. The difference (49·4 per cent.) is statistically significant—being 5·3 times its standard error (9·24).

TABLE II

SHOWING THE NUMBERS OF SALMONELLA POSITIVE CASES AMONG CALVES DYING ON VARIOUS DAYS AFTER BIRTH

	Days to death													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No. examined ..	17	25	14	8	12	8	7	13	5	3	5	2	3	2
No. salmonella positive ..	5	7	9	7	7	8	7	10	3	3	4	1	3	2

As to the animals dying within two days of birth, many of them within a few hours, the cause of death has not been ascertained. Organisms of pathological significance have never been consistently isolated; in fact the only organism of this type found has been the salmonella from the few cases referred to above. At *post-mortem* examination in these cases the fourth stomach was usually found to contain a large quantity of undigested milk. On the whole we think that dietetic errors are responsible for these early deaths. It is worthwhile noting that during this period it had been the practice on the farms to wean calves at birth and rear them on an artificial teat. Since that practice has been stopped (for other reasons) there has been a marked drop in the incidence of calf scours.

BACTERIOLOGY

Strains of salmonella isolated from month-old calves had the following characteristics. Gram-negative, non-sporing, motile bacilli; gave profuse growth on agar and uniform turbidity in broth; produced acid and gas in glucose, maltose, mannite, dulcite, sorbite, xylose and trehalose; no acid or gas in lactose, sucrose, salicin, inosite, arabinose, raffinose or inulin; indol negative; litmus milk rendered slightly alkaline with, later, some decolorization of the litmus. Serological "mirror" tests have not been carried out owing to the difficulty of obtaining immune *S. dublin* serum. However, sera containing calf strain agglutinins have been absorbed with *S. dublin* and *S. enteritidis* as well as with the calf strains. It has been shown that O suspensions of all three organisms remove all O agglutinins for the calf strain. H suspensions of *S. dublin* remove H agglutinins for the calf strain. H suspensions of *S. enteritidis*, however, while reducing the titre do not remove all H agglutinins for the calf strain. In view of these combined findings it seems reasonably certain that the calf strains were *S. dublin*.

The strains of salmonella isolated from calves dying within 14 days of birth had the following characteristics. Gram-negative, non-sporing, motile bacilli; gave profuse growth on agar and uniform turbidity in broth, produced acid and gas in glucose, maltose, mannite, dulcite, sorbite, inosite, arabinose, xylose and sometimes trehalose; no acid or gas in lactose, sucrose, salicin, raffinose or inulin; indol negative, litmus milk slightly alkaline. Only slide agglutination tests have been carried out with these strains and the results were somewhat variable; in general they agglutinated with *S. typhi-murium* O serum but not with *S. enteritidis* O or *S. paratyphi A.* O; many strains in addition agglutinated with *S. suipestifer* O serum. This organism is therefore similar to, though in some respects different from, *S. typhi-murium*.

The sugar and agglutination reactions of the two types of strains from buffalo calves are summarized in Table III; the reactions of typical *S. dublin* and *S. typhi-murium* are included for comparison.

TABLE III

SHOWING THE SUGAR AND SEROLOGICAL REACTIONS OF BUFFALO-CALF SALMONELLA STRAINS

		Typical *S. dublin*	Calf *S. dublin*	Typical *S. typhi-murium*	Calf *S. typhi-murium*
Glucose		AG.	AG.	AG.	AG.
Maltose		AG.	AG.	AG.	AG.
Mannite		AG.	AG.	AG.	AG.
Sucrose		—	—	—	—
Lactose		—	—	—	—
Salicin		—	—	—	—
Dulcite		AG.	AG.	AG.	AG.
Sorbite		AG.	AG.	AG.	AG.
Inosite		—	—	AG.	AG.
Arabinose		—	—	AG.	AG.
Xylose		AG.	AG.	AG.	AG.
Trehalose		AG.	AG.	AG.	AG.
Inulin		—	—	—	—
O agglutination	*Para. A*	—	—	—	—
	Typhi-murium	—	—	+	+
	Enteritidis	+	+	—	—
	Suipestifer	—	—	—	±

TOXICITY OF CALF *S. typhi-murium* STRAINS

Several attempts have been made to prepare immune rabbit serum and in nearly all cases the rabbits have succumbed to relatively small doses.

Two rabbits were inoculated intraperitoneally with 1·0 c.c.

heated (56° C.) saline suspension (standardized to tube 3 of the Brown scale) and both died within 24 hours.

Three more rabbits were inoculated intravenously with 1·0 c.c. heated broth culture and all died overnight.

Four more rabbits were inoculated subcutaneously with 0·5 c.c. heated broth culture; they survived and received a second inoculation subcutaneously one week later; they still survived and were given an intravenous inoculation of 0·5 c.c. and all died within a few hours.

One nine- to ten-year-old fat bullock was given a series of inoculations subcutaneously with mixed suspensions of calf strains; the suspensions were at first heated killed and later living, the dose was about 10 c.c. and got progressively denser over a period of about ten weeks. Finally this animal was given an intravenous inoculation of 10 c.c. of a heat killed saline suspension. It developed acute tympanites (which was reduced by trocar) and died within four hours.

It will be seen therefore that these strains are highly toxic.

Pathology

In calves which die during the first 48 hours after birth very few lesions are seen. The picture may be similar to one of mild septicaemia but the lesions are usually so slight that they may easily be missed entirely. The organs most affected are the heart, spleen, kidneys and lymph glands. Reference has already been made to the finding of undigested milk in the fourth stomach. There is sometimes a mild catarrhal enteritis.

In calves infected with *S. typhi-murium*-like organisms, especially those surviving for seven to 14 days, the *post-mortem* examination picture is as follows. The heart shows petechiae under the epicardium and sometimes blood spots. Lungs are usually normal but occasionally show hepatization at the base (this lesion may well be caused by some other organism). The fourth stomach shows catarrhal or haemorrhagic inflammation. There is always a pronounced enteritis and, if the calf survives ten days or more the latter part of the small intestine and the whole of the large intestine show necrosis with desquamation of epithelium; there may also be ulcer formation especially in the region of the ileo-caecal valve. The liver is congested and may show fatty degeneration. The spleen shows subcapsular petechial haemorrhages, the trabeculae are hypertrophied and the consistency is like that of rubber. The kidney shows cloudy swelling and there is oedema in the pelvis. Most of the lymph glands are enlarged, especially the mesenteric glands; they become haemorrhagic and sometimes necrotic (in advanced cases). The characteristic lesions of this particular infection are the enlargement, rubber consistency and haemorrhagic spots in the spleen, the enlargement of the mesenteric lymph glands and the gelatinous oedema in the pelvis of the kidney.

No serious study of the pathology of *S. dublin* infected cases has been carried out.

Diagnosis

Throughout this work diagnosis has been by isolation of the causal organism in pure culture. No special media other than MacConkey have been used. A small piece of material under examination was smeared on to MacConkey agar and streaks made from this. After incubation non-lactose fermenting colonies were picked into broth. Six hours later they were examined for motility and then sown into glucose and lactose and on to an agar slope. The following morning thick saline suspensions of the agar growth were tested against *S. typhi-murium*, *S. enteritidis*, *S. paratyphi A* and *S. suipestifer* O sera on a slide. On only one occasion was a salmonella organism isolated which failed to agglutinate with one or more of these sera. Sometimes slide agglutination tests were carried out direct on the growth from the MacConkey plate. This technique was simple and satisfactory, but it is likely that an even higher percentage of positives would have been obtained had specially selective media been used.

We have found that the most profitable source of isolation has been the mesenteric glands. In all cases where faeces or other tissues or fluids (*e.g.*, spleen, liver, heart-blood, etc.) have been compared with mesenteric glands the latter have shown to advantage. It is indeed a fact that in every case when salmonella organisms were isolated from some other source they were also isolated from the mesenteric glands; whereas on many occasions the organisms were isolated from mesenteric glands and not from other sources. This can be demonstrated with the figures shown in Table IV. Thus of 32 animals in which faeces and mesenteric glands were examined, 17 were gland positive and of these nine were faeces negative; eight were faeces positive and all these were also gland positive. Small though the figures are they are statistically significant ($\chi^2 = 18{\cdot}306$; $p = < 0{\cdot}01$).

Table IV

Showing a comparison between Faeces and Mesenteric Glands as a source of Salmonella

		Faeces cultures		Total
		Positive	Negative	
Gland cultures	Positive ..	8	9	17
	Negative..	0	15	15
Total		8	24	32

Finally, it is worth while noting that in many cases apparently pure cultures of salmonellae were obtained from mesenteric glands.

The Origin of Infection

It seemed probable that adult buffaloes acted as carriers of salmonella organisms. However, the chances of isolating the organisms from faeces without adopting a special technique were so remote that no attempts in this direction were made. In lieu of direct cultural examinations a number of buffalo sera have been examined for O agglutinins against suspensions of *S. dublin* and of the calf *S. typhi-murium* standardized to tube 1 of the Brown scale. The results are shown in Table V.

Table V

Showing the Numbers of Buffalo Sera reacting to various Titres when tested against *S. dublin* and the Calf *S. typhi-murium*

Titre	Antigen	
	Dublin	Calf *typhi-murium*
Negative	43	10
1 : 10	37	9
1 : 20	8	7
1 : 40	4	28
1 : 80	1	22
1 : 160	—	11
1 : 320 and over ..	—	6
Total	93	93

It may be seen that although there is not much evidence of *S. dublin* infection among adults, 79·6 per cent. of the sera reacted at 1 in 20 or over against the calf *S. typhi-murium*. Incidentally, later, one buffalo was found with a titre of 1 : 2,560 to this organism. We think that these findings constitute circumstantial evidence indicating the probable source of the main type of infection.

Active Immunization Experiments

Under the early misapprehension that the majority of the calves were surviving for one month, we decided to attempt active immunization with suspensions of what we then believed to be the primary causal organism, *viz.*, *S. dublin*. At no time were we optimistic about the probable outcome of the experiments since very young animals are known to be poor antibody producers, but it did seem just possible that an active immunity could be set up before the onset of susceptibility. Accordingly vaccine was prepared from a *S. dublin* strain isolated from one of the buffalo calves. The vaccine consisted of a 0·5 per cent. carbol-saline suspension of heat killed organisms standardized in density to tube 2 of the Brown scale; 5·0 c.c. were inoculated subcutaneously. Alternate calves were inoculated on the day of birth. In all, 51 were vaccinated and 51 were left as controls; 41 of the vaccinated and 31 of the controls died within the observation period of 14 days. It was clear, therefore, that this vaccine was useless and might even be harmful.

A second experiment was carried out later along similar lines, using a vaccine of the calf *S. typhi-murium* strain. In this there were 54 vaccinated and 54 controls; 41 of the former and 40 of the latter died. Again, as was expected, more particularly in this case, it was evident that vaccination was without any beneficial effect.

Passive Immunization Experiments

Since infection and mortality occur so very early in life, it seemed that passive immunization was the logical way of dealing with this disease. Attempts were therefore made to produce high titre immune sera in buffaloes. Great difficulties were experienced; it seems that the buffalo is a poor responder to an antigenic stimulus. However, a small quantity of serum with an O titre (typhi-murium) of 1 : 1,280 was eventually obtained. This was inoculated intravenously in a dose of 25 c.c. into a small group of calves on the day of birth; another group of animals received 25 c.c. normal buffalo serum, and a third group was uninoculated. All these animals were kept under

observation for 14 days. The results are shown in Table VI, from which it may be seen that of eleven calves receiving immune serum six survived the experimental period; of nine receiving normal serum only two survived and of nine receiving no serum only one survived. Statistically the difference between the group receiving immune serum and that receiving no serum is barely significant, being only twice its standard error. Nevertheless the results are undoubtedly encouraging and the method deserves further study. This belief is supported by a comparison of the mean times to death which in the immune serum group was 10·8 ± 1·4 days and in the no serum group was 5·8 ± 1·6 days; the difference of 5·0 ± 2·1 is 2·3 times its standard error.

TABLE VI
SHOWING THE RESULTS OF A PASSIVE IMMUNITY EXPERIMENT

Inoculum	Survived	Died	Total
Immune serum ..	6	5	11
Normal serum ..	2	7	9
Nil	1	8	9

In another experiment an attempt was made to confer passive immunity on calves using high-titre normal buffalo serum. A group of 20 calves received 50 c.c. of this serum intravenously on the day of birth; another group of 20 was kept as uninoculated controls. Sixteen animals in each group died within 14 days; however, the group receiving serum did show a slightly higher survival time (6·25 days) than the control group (5·25 days). Disappointing though this result was, we would certainly advocate the use of high-titre normal serum in the absence of immune serum.

VITAMIN THERAPY

A daily dose of 100 mgm. nicotinic acid in water was given *per os* to 20 calves for five days after birth; another group of 20 calves were kept as controls. Thirteen of the treated and 15 of the control animals died within 14 days. It was concluded, therefore, that nicotinic acid deficiency was not a primary cause of the trouble.

In another experiment a cod-liver oil preparation was fed to calves. Each of twelve treated calves received 5·0 c.c. (each c.c. containing 5,000 I.U.); 16 calves were kept as controls. Of the treated five, and of the control animals three, died within the 14 days' observation period. It cannot be concluded from this that vitamin A therapy is highly beneficial. It was noted, however, that the treated animals showed little or no sign of the conjunctivitis common in calves suffering from scours. The disease incidence at this time was declining, as is evident from the small number of deaths in this particular experiment; it is possible that had the disease been more rampant a more striking difference between the two groups would have been observed.

DISCUSSION

Our findings appear to differ somewhat from those of other workers on cow calves. The main cause of scours in cow calves is *S. dublin*, admittedly in older animals as a rule. Here our main cause of the trouble has been a *S. typhi-murium*-like organism; *S. dublin* appears to be responsible for only a relatively mild or chronic type of disease.

It is curious how widespread *S. dublin* appears to be. It has now been isolated in every continent in the world and in most countries. However, in the Lahore area the *S. typhi-murium* organism is more widespread; apart from the obvious clinical findings in buffalo calves, this belief is supported by the finding of a greater number of serum reactors to *S. typhi-murium* than to *S. dublin* in adult buffaloes.

Some workers have incriminated *Bact. coli* as a cause of scours. We are frankly sceptical of this belief. *Bact. coli* is, after all, an ubiquitous organism and a commonly recognized commensal. There seems no reason why it should suddenly develop pathogenic potentialities. At any rate in buffalo calves here we are prepared to assert that *Bact. coli* plays little or no part; the finding of salmonella in 78 per cent. of calves dying of typical scours speaks for itself; this, moreover, without resort to any very specially selective technique.

The route of infection is another point which has occupied the attention of workers from time to time. We are of divided opinions. One of us (D. A.) accepts the conventional belief that infection occurs through the umbilicus, resulting in a transient bacteraemia prior to colonization in the intestine. The senior writer (F. W. P.) believes that the almost consistent finding of salmonella in the mesenteric glands (as opposed to its rare occurrence in the blood stream) indicates infection through the mouth, the organism probably passing through an intestinal mucous membrane rendered relatively permeable by a vitamin A deficiency. Without more data further speculation on this point would be profitless.

Summary

There are at least three different aetiological entities responsible for scours in buffalo calves in the Lahore area. Deaths during the first two days after birth appear to be attributable to dietetic errors. During the next 14 days or so the cause is an organism resembling *S. typhi-murium*, which is responsible for at least 50 per cent. of all deaths. A number of month-old calves become sick and may die as a result of *S. dublin* infection.

The pathology of the main condition has been briefly described.

The most profitable tissue to examine with a view to isolation of the causal organism has been found to be the mesenteric gland.

Judging by agglutination tests, it would seem that adult buffaloes act as a reservoir for the spread of infection, at least for that caused by the *S. typhi-murium*-like organism.

Attempts to stimulate active immunity in calves by vaccination were very naturally unsuccessful, but the results of passive immunity experiments held out some hope of future success.

Vitamin therapy was unsuccessful though calves receiving cod-liver oil did show some improvement in condition.

The work outlined in this paper is incomplete in many ways; the antigenic structure of the probable aetiological agents has not been worked out; the immunization studies are unfinished; many epidemiological factors still remain undetermined, and no attempts have been made at treatment. These deficiencies are in evidence primarily because the disease incidence died down during 1945 and little material was available for study. The work must remain unfinished by us since we are both shortly expecting to leave this country. It is presented in its present state in the hope that it may be of some value to future workers.

A Preliminary Note on Salmonella dublin Infection in Adult Cattle*

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During recent years an acute enteritis, often fatal, has been met with in adult cattle. It is associated with *Salmonella dublin* (*Bact. enteritidis* var. *dublin*). The condition is usually sporadic, one member of a herd being stricken while kept under exactly the same conditions as the rest of the herd. Occasionally more than one animal may be affected at the same time.

The onset is sudden and the symptoms may take the form of an enteritis, muco-enteritis, or dysentery. In all cases the faeces are very watery and evil smelling. Depression is often intense, the cow standing with head lowered and showing very little or no interest in food of any kind. Thirst is always intense. The temperature varies: in some cases it is as low as 99·5°, and in others it is about 104° F. The dysentery cases tend to show the higher range. Milk secretion is either markedly reduced or suspended. In the fatal cases, the strongest astringent has no effect, the patient becoming progressively weaker and dying usually within three or four days.

Prognosis is best based upon the degree of depression and the appetite and not upon the intensity of the enteritis. Cases showing marked dysentery may show a better appetite than cases of simple enteritis, and it is the former cases which usually recover.

Small numbers of *S. dublin* have been recovered from the milk of infected cows. If the cow is pregnant, abortion occurs and *S. dublin* can be isolated in pure culture from the heart-blood and stomach of the foetus.

Diagnosis is made by culture of the faeces and by serological examination of the blood. In acute cases dehydration is so marked that the blood is barely fluid and it may be very difficult to obtain a blood sample with an ordinary blood needle.

Clinically it is often impossible to differentiate this condition from scours of non-specific origin and there is little doubt that, before laboratory diagnosis was employed, many cases were missed.

Treatment is symptomatic.

Post-mortem examination shows a diffuse inflammation along the whole length of the intestinal tract. Enlargement of the spleen has not been noticed.

All the recovered cows have become carriers and have excreted *S. dublin* in large numbers in the faeces for long periods but the length of time for which such excretion can take place is not yet known. *S. dublin* infections are more common in calves than in adult cattle (for references to the relevant literature see Wilson & Miles, 1946, pp. 736 and 1600) and it is an interesting feature of the outbreaks here recorded that the clinical cases have been confined to adult cattle. The source of infection is obscure and no common factor

* Paper presented at a meeting convened by the Department of Animal Health and the Veterinary Investigation Department, University College of Wales, Aberystwyth, January 27th, 1946.

has yet been found. In calves, *S. dublin* infection is acquired by ingestion and it is generally believed to enter the pens in carriers or in milk. Predisposing causes undoubtedly have a marked influence on the infection: whether the same factors apply to adult cattle is not known. The potential danger of carriers to the rest of the herd is as yet uncertain.

Illustrative Case Records

(1) Seven-year-old cow, in milk with a daily yield of two gallons.
22.9.45.—Sudden onset of very watery diarrhoea. Acute depression. Temperature 99·5° F. Cessation of milk yield was so complete that a sample could not be obtained. Appetite completely lost. Treated until 25.9.45, when she died. Laboratory reported Salmonella in faeces and blood titre positive.

(2) Three-year-old heifer, in milk.
30.11.45.—Sudden onset of dysentery. Depression not acute. Temperature 104° F. Food was picked at.
Laboratory report:
Faeces: a Salmonella, probably *dublin*, present.
Blood: *S. enteritidis* (H), agglutination to 1 in 1,000. *S. typhosum* (O), agglutination to 1 in 250. Non-specific Salmonella, agglutination to 1 in 100.
Treatment consisted of astringents, demulcents, and control of drinking.
4.12.45. Convalescent.
10.1.46.—Still excreting large numbers of *S. dublin* in the faeces.

(3) Six-year-old cow, six months pregnant.
11.11.45.—Sudden onset of diarrhoea. Depression not acute. Temperature 105° F.
Laboratory report:
Faeces: a Salmonella, probably *dublin*, present.
Milk: Salmonella present in small numbers.
16.11.45.—Recovering slowly.
21.11.45.—Abortion.
Laboratory report:
S. dublin in pure culture from the heart blood and stomach of foetus.
27.11.45.—*S. dublin* still present in large numbers in faeces.
15.12.45.—Unfortunately sold for slaughter.
Enquiries revealed the fact that a cow, No. 52, had been introduced into the herd on 24.10.45, and on 17.11.45 examination of faeces showed Salmonella present in small numbers while the blood showed agglutination to *S. enteritidis* (H) 1 in 50, and to *S. typhosum* (O) 1 in 50.
The lowness of these titres coupled with the positive faecal culture shows either that the infection was recently acquired or that the original acute infection had occurred some time previously.
By 25.1.46 no Salmonella could be demonstrated in the faeces of this cow. It is a matter of conjecture whether this cow was the means of introducing the infection into the herd.

(4) Six-year-old cow (L34), six months in calf.
22.11.45.—Sudden onset of watery diarrhoea with some mucous membrane and blood present. Temperature 99·5° F., but depression not acute, the patient picking a little food.
Laboratory report:
Faeces: *Salmonella dublin* present (+++).
Blood: *S. enteritidis* (H), agglutination to 1 in 100. *S. typhi* (O), agglutination to 1 in 250. *S. dublin*, agglutination to 1 in 250.
26.11.45.—Responding slowly to treatment.
12.12.45.—Abortion.
Laboratory report showed *Salmonella dublin* present in heart blood and stomach of foetus.
21.12.45.—Faeces showed Salmonella present (++++).
17.1.46.—Faeces still showed Salmonella present (++++).
Milk negative.

Faeces and blood from the rest of the herd were now examined. The whole of the herd showed abnormally high blood titres, and faeces from cow L26 showed Salmonella present (+).

This leads one to suspect that the recovered cow, by excreting large numbers of Salmonella, may be causing sub-clinical infections, with the development of agglutinins, in the rest of the herd and has actually infected L26.

Acknowledgment.—Thanks are due to Mr. J. Bowen, M.R.C.V.S., who carried out much of the clinical work, and to Drs. R. M. Fry and Joan Boissard, of the Emergency Public Health Laboratory, Carmarthen, for carrying out the laboratory diagnosis, and for much helpful advice.

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SALMONELLA DUBLIN INFECTION IN ADULT CATTLE

THE investigations on the aetiology of food poisoning in man were retarded many years ago largely because it was found difficult or impossible to determine the sources of infection except in a small number of outbreaks. It was suspected that domestic animals played a considerable part in acting as reservoirs for Salmonella bacteria and whilst the validity of this suspicion may not be accepted in more than a few cases it is known that certain well-defined types of Salmonella may be found in domestic animals. Attention was focused on the association of *S. dublin* with cattle in 1930 because so many outbreaks of *S. dublin* infection in man appeared to originate from milk or milk products, and the identity of *S. dublin* and the "paracolon" bacilli of Danish authors was established. Although calves are known to suffer from an acute form of this disease it has been pointed out before that some of the diarrhoeas of dairy cows are due to Salmonella bacteria. The article by John, on another page, emphasizes this fact. The recovered cows are stated to become carriers and to excrete the organism in the faeces for long periods. The duration of the carrier state is not known and this is an important aspect of the investigation which should be pursued. It would be a useful addition to our knowledge if it could be established that the "carrier" cows which are identified from time to time suffer from an acute disease before acquiring the carrier state. These problems are important, for not only is the health of the individual animal implicated, but there is undoubtedly a danger that the disease will spread to calves causing a severe loss and perpetuating the infection. Finally, the health and well-being of the human population are involved and the first intimation of disease may be derived from the appearance of an outbreak of food poisoning in man.

CLINICAL COMMUNICATION

Caesarean Operation on a Cow*

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Subject.—Pedigree Friesian cow, middle-aged.

History.—Had suffered a fracture of the anterior part of the ilium, resulting in serious downward and sideways displacement of the pelvis, and a large callus which partly obstructed the pelvic cavity. She was in labour when first seen but the membranes, which were protruding from the vulva, had not ruptured. I had seen but not examined this cow some days previously and was prepared for any emergency on my arrival. After a careful examination of the pelvis a Caesarean operation was decided upon.

Preparation.—An area about 16 in. long and 4 in. wide on the right flank was cleansed, shaved and swabbed with spirit.

Anaesthesia.—Three ounces of chloral hydrate in one quart of water per os. The cow became recumbent in about 30 minutes and was secured by stretching the hind and forelegs respectively backwards and forwards by ropes tied to posts. A Cox's mask was adjusted and chloroform given, starting with 1 oz., thereafter reinforced by ½ oz. as required.

Operation

A clean sheet was laid across the cow and the operation performed through a slit cut in it. The incision was made from a point about three inches below the transverse lumbar processes, parallel

* Presented to the Eastern Counties Division, N.V.M.A., at the Annual Meeting at Norwich, March 13th, 1945.

to and about four inches behind the last rib, approximately 16 inches long, through the skin, muscles and peritoneum. Some portion of mesentery and bowel was met lying over the uterus and was moved aside, exposing the uterus, which bulged upwards into the incision fairly conveniently, and was incised for about 14 inches, exposing the foetal membranes. The edges of the wound were packed with sterile cotton and at this point the membranes already protruding from the vulva were ruptured by hand to allow the escape of the fluid as far as possible without soiling the wound.

As soon as it was judged that nearly all the fluid was drained off, the remaining membranes were incised, the calf (which was lying in a normal anterior presentation) was pulled back from the pelvis and extricated head first, and alive.

The uterus was sutured with two rows of continuous Lembert sutures, the second row burying the first, using No. 3 chromic catgut and a round curved bowel needle. The peritoneum was sutured separately, using the same size catgut, with interrupted continuous sutures about 4 in. long. The muscles and lastly the skin were then similarly sutured, using the same sized catgut, in continuous sutures each about four inches long.

Sulphanilamide was dusted into the wound at each stage of suturing.

No attempt was made to remove the placenta, but 5 c.c. of pituitrin was given subcutaneously. The cow was released and was shortly able to sit up in a natural position supported by a bag of chaff against her shoulder.

Subsequent Treatment.—The following day the cleansing was removed quite easily and two large capsules of sulphanilamide were left in the uterus. The cow was up and behaving in a normal manner, chewing her cud, etc. The wound was cleaned dry and was dusted with sulphanilamide. Subsequent progress was uneventful, except for the middle part of the wound, where a pocket had been left in the muscles and drainage coming through the wound loosened the sutures and 6 in. of the wound lay open after about six days. After thorough cleansing and packing with sulphanilamide it healed well with almost no further treatment in about five weeks. The top and bottom portions healed by first intention and sutures were removed in 12 days. The calf—a bull—survived and was reared for stud purposes.

ABSTRACTS

[The Colostrum Pregnancy Test in Cattle. Cairy, C. F. (1945.) *Amer. J. vet. Res.* **6**. 252-256.]

Successful results have been claimed for an intradermal pregnancy test in women, using colostrum as an antigen. Pregnant women show little or no reaction to the antigen, whereas non-pregnant subjects show a characteristic weal surrounded by a reddened area.

The work described in the present article was undertaken to determine whether a similar pregnancy test would be applicable to dairy cattle. The bovine antigen was prepared by collecting the colostrum from first-calf heifers between 5 and 8½ months pregnant; this material was diluted 1:1 with sterile normal saline and filtered through a Berkefeld filter; 0·1 c.c. of a 1 per cent. solution of merthiolate was added to each 10 c.c. of antigen as a preservative. The site adopted for injection was the vulval mucosa 6 to 12 mm. from the vulval orifice; 0·125 c.c. was found to be the most suitable amount of antigen for injection. Readings were made at 10, 30, and 60 mins., and the results recorded as "pale, slightly red, red and swollen, etc." Unless an easily recognized reddening or swelling developed, the cow was considered to test pregnant.

The results of 322 colostrum injections into 35 cows indicated that the test is not of sufficient accuracy in cattle to be used as a pregnancy test. It appeared that the chief cause of discrepancy lay in the animal, for some individual cows responded to a series of tests with an accuracy of higher than 90 per cent., whilst in others the accuracy was extremely low.

N. J. S.

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[Observations on Subluxation and Luxation of the Crystalline Lens in the Dog. Formston, C. (1945.) *J. comp. Path.* **55**. 168-184.]

The author presents data to support his contention that the lenticular displacement he describes is a primary affection, which is hereditable and becomes evident in early adult life.

The disease is presumably associated with degenerative changes in the suspensory apparatus, which are followed by stretching and ultimate rupture of the zonular fibres. In the early stages, the loss of tension allows the lens to assume the shape of maximum accommodation, and it moves back from the normal position in which it supports the iris, so that with every movement of the head or eyes there is distinct tremor of the iris (iridodonesis). The exaggerated movement of the iris leads to iritis, which by extension gives an irido-cyclitis. A consequent rise in protein content of the aqueous humour interferes with its filtration, and a secondary glaucoma follows: this may be accentuated by increased pressure on the branches of the oculomotor nerve as they pierce the choroid to supply the sphincter muscle of the iris, dilatation of the pupil impeding filtration. Further, should the iris, by making contact with the cornea, cause a peripheral anterior synechia to develop, the filtration angle may be partially or completely eliminated. The increased size of the globe contributes to the ultimate breakdown of the zonule. The lens may be retained in the fossa patellaris, being held in position by inflammatory adhesion to the hyaloid membrane, or it may pass into the anterior chamber, or (more rarely) into the vitreous cavity. Due to impairment of vision, injuries to the cornea, leading to an anterior keratitis, are now prone to occur, while the lens pressing on the posterior surface of the cornea may produce a posterior keratitis. Usually the zonular degeneration is a gradual process, but in some cases the lens appears to be suddenly precipitated into the anterior chamber.

The author has studied over 100 cases of the condition. It was encountered in two breeds only: 90 per cent. of cases were in wire-haired fox terriers, and 10 per cent. in sealyhams. The usual age incidence was from three to six years, no case being seen under three years of age. In at least 62 per cent. of the cases, displacement was bilateral, and it is probable that some of the other cases, encountered early in the investigation, were also bilateral, the early stages of displacement possibly being overlooked. In only 10 per cent. of cases did the owner suspect a traumatic cause, and it was noted that most of the corneal lesions developed *after* displacement.

The clinical manifestations are considered under four headings:

1. *Subluxation.*—In many cases, there is a history of transient attacks of acute pain, blepharospasm, lachrymation lasting 24-36 hours, and frequently a hazy "blue film" over the cornea, sometimes persisting for several days. These acute symptoms are transient, but tend to recur. The dog may show impaired vision, especially if the lesion is bilateral. The increased intraocular pressure, which is highest during the early stages of the disease, may be gauged by applying digital pressure to the outer surface of the eyelid. The cornea may be transparent, or show localized opacity or a diffuse "haziness." Corneal vascularization is not often encountered in subluxation cases. The iris reacts sluggishly to light, but iridodonesis is present if it is capable of movement: this is a useful early diagnostic sign. The anterior chamber seems less deep than normal. When the pupil becomes dilated, a part or the whole of the edge of the lens becomes visible, the aphakic pupillary area (from which the lens is absent) being ring-like or crescentic. This area, due to reflected light from the tapetum not having to pass through lens substance, is more luminous than the rest of the pupil.

2. *Anterior luxation.*—The lens is luxated into the anterior chamber, and the edge, with focal illumination, shows up as a silvery-grey line. Movement of the lens in the anterior chamber may be detected, and there is often an area of posterior keratitis.

3. *Posterior luxation.*—Only 5 per cent. of cases showed this condition. The lens lies horizontally on the floor of the vitreous cavity: it does not interfere mechanically with aqueous humour filtration, or notably interfere with vision. The pupil is only partly dilated, the iris is tremulous, and the pupillary area is totally aphakic.

4. *Hydrophthalmos* (*Buphthalmos*).—This is a stage of secondary glaucoma in which the eyelids can no longer envelop the eyeball. All cases of hydrophthalmos in wire-haired fox terriers (apart from one doubtful case in which no lens could be found) have been associated with anterior luxation. The eyeball fills the orbital cavity completely, and its movements are restricted. The palpebral aperture is incompletely closed, while the cornea is flattened peripherally and bulges centrally. There is a keratitis present, and the animal is blind; there is little or no pain. A characteristic feature is a blue colour of the ectatic sclera. The shrunken and opaque lens is invariably found adherent to the posterior surface of the cornea. The ciliary body is atrophic, and the posterior and vitreous chambers are confluent. Tearing or partial or complete detachment of the retina may be present.

E. C.

Weekly Wisdom

There is substance in the view that business administrations and the Civil Service would be better equipped for their tasks if they had a reasonable proportion of men and women with a scientific training.—The Times.

Questions and Answers

"Questions and Answers" will be published on alternate weeks.
The submission of questions for inclusion in this column will be welcomed: they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.
Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.
All communications should be addressed to the Editor.

Sulphanilamide Administration and Milk Yield

Q. CLVII.—*A number of our clients have developed the impression that sulphanilamide administration therapeutically for any reason reduces considerably the milk yield of the cow.*
Is this based on fact or not?

A.—There is a commonly held belief that sulphanilamide administered by the mouth reduces considerably the milk yield of the treated cow. Certainly in a small percentage of cases the yield is seriously affected. Stableforth *et al.* (1942) discussing the effect of sulphanilamide given therapeutically by the mouth state:—

> "Comparison of the recorded milk yields of treated and untreated cows showed that, whilst the yield in certain cases dropped 40 per cent. during the week of dosing and was still 20 per cent. below normal the following week, other cows showed no drop whatever. The average loss of milk attributable to sulphanilamide worked out at 18 per cent. for the week of treatment and 9 per cent. for the following week, yields thereafter being normal."

Work which has been done on the injection of solutions of sulphonamides or sulphanilamide in suspension into the udder *via* the teat canal has indicated that there is little interference with milk yield. When there is some suppression of mammary secretion during the treatment the yield returns to normal a few days after treatment has been discontinued.

Sulphanilamide given parenterally has little or no effect on milk yield.

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Rothera's Reactions in Milk and Urine

Q. CLVIII.—*What is the relative clinical significance of positive Rothera's reactions in milk and urine? In a recent clinical case of acetonaemia (nervous type) the milk gave a negative reaction and the urine a positive one, yet positive reactions have been given in the milk of cows not clinically suspected.*
What is the significance of a positive reaction in the milk of a cow with metritis? In such cases is the acetonaemia secondary to the metritis, and will it disappear spontaneously as the metritis responds to treatment, or should the acetonaemia be treated separately?

A.—Although the clinical entity, which is very well recognized, is usually referred to as "acetonaemia," it is probable that the majority of the symptoms associated with the disease are due to a hypoglycaemia and not due to the presence of ketone (acetone) bodies, which are largely non-toxic.

Further, it is well to remember that frequently more than one metabolic disturbance may co-exist (hypoglycaemia, hypocalcaemia and hypomagnesaemia, etc.), and clinically it is often very difficult to determine the exact nature of the condition as met in the field.

Thirdly, it should be borne in mind that many cases of acetonaemia are chronic, and even sub-clinical.

From these three points it will be seen that normal tests for acetonaemia must always be considered in relation to clinical symptoms and history, and not be regarded as a fool-proof indicator to the clinicians.

A raised blood acetone concentration is merely an indication of a deranged metabolism of either fat or possible carbohydrate and may indicate pancreatic insufficiency, fatty liver, etc. Certain inflammatory conditions such as pneumonia or metritis may bring this about and acetone bodies appear in the blood until the disease has resolved itself.

In actual practice the writer has found that a strong positive reaction to the Rothera's test on urine may generally be regarded as a reliable sign of acetonaemia. The test on the milk is equally valuable. A blood analysis will give a more complete picture, relating the blood acetone to blood Ca and Mg.

For further information the reader is referred to the article by Messervy (*Vet. Rec.*, Vol. 55, No. 42) and to Udall's "Veterinary Medicine," fourth edition, 1943, page 342. Both these articles give further references.

Dr. G. Roche Lynch has been elected President of the Royal Institute of Chemistry for 1946-47.

IN PARLIAMENT

Students' Call-Up

Conditions Governing Entry Into the Universities

In the House of Commons on Tuesday of last week Mr. Isaacs made the following statement on the above:—

The conditions governing the entry of students to the universities for the year beginning October, 1946, have been considered in the light of the general man-power position, and the following decisions have been reached:—

(1) Preference will be given to men who have served in the armed Forces and others who have been engaged for an equivalent period in important civilian work, provided they are suitable for acceptance by the university concerned.

(2) Places in all subjects at universities should be filled.

(3) Any young men still liable to be called up for military service who are granted deferment to enable them to study at a university will be called up on the completion of their course.

In reaching these decisions I have borne in mind the need to secure that full use is made of the training facilities available at universities.

It will be open to the universities to apply for release in Class B of scholars and highly promising students in any subjects who are still serving in the Forces and are in release groups 1 to 55. The universities may also admit students with similar qualifications who have completed three years' work of national importance by September 1st, 1946, and such students will be granted continued deferment of their calling up to enable them to complete their studies.

After the requirements of ex-Servicemen and of those whose service has been on important civilian work have been satisfied, any remaining places in any subject may be filled by scholars and promising students in the age group October 1st, 1927, to September 30th, 1928, who are recommended for deferment by joint recruiting boards. It will, however, be open to any university to make out a special case for reserving places for scholars and promising students in the above age group, subject to the maximum of 10 per cent. of the places available, where their acceptance would result in the exclusion of older men who have been engaged in the Forces or on civilian war work.

These arrangements involve a change as regards medical, dental, and veterinary students. Such students have hitherto been reserved; in future new entrants will be dealt with in the same way as other students and will have to be considered individually for deferment by joint recruiting boards.

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The National Health Service Bill

Superimposed on the holiday atmosphere which attended reassembly after the Easter Recess was that of "the big occasion," for it coincided with the Second Reading of the Health Bill, to which the Government accorded three days. At the end of hard hitting sessions the Health Minister of course secured his majority—187—but as these proceedings and those of the British Medical Association (sitting concurrently in special session), as recorded in our Notes columns, revealed, the debate is by no means at an end.

The provisions of the Bill were summarized in our issue of March 30th.

Mr. Bevan's most controversial change is the proposal to nationalize the hospitals in order to regionalize their management, and it was against this change that Opposition speakers concentrated most of their fire. The Minister argued that it would be dangerous to separate responsibility for planning and responsibility for administering the hospital services. He indicated that he would be prepared to consider amendments in Committee on the hospital service and the composition of the regional hospital boards. But he stood firmly by his scheme, declaring that it was repugnant to a civilized community that hospitals should have to rely on private charity.

Mr. Richard Law, from the Opposition front bench, declared that a great opporunity had been missed of producing a scheme which would have been welcomed by every section of the community, lay and medical. Instead, the Minister had made proposals which were feared and distrusted by the great majority of those who would be called upon to make them effective.

The Bill came in for some criticism from the opposite angle from the Ministerial side, although it was nevertheless welcomed, some members taking exception to the proposal that doctors should be allowed to practise both within and without the health service. Sir Henry Morris-Jones made an urgent appeal to the Minister of Health to reconsider his proposals and amend them as they affected the medical practitioners and the hospitals. The proposal was to pay

a basic salary, but the demand for an incentive in work could not be altered. The proposals for compensation amounted to the establishment of a forced loan. For the first time also direction was being imposed by statute on a body of people as a permanent measure, in spite of the fact that the Minister had not established his case that there was maldistribution of doctors.

He had misgivings about the Government taking over the treatment of sickness as a national matter. It would be the death knell of the family doctor who had been known in this country for generations. The scheme would create dull uniformity—a utility scheme with a utility service in which doctors signed and certified more and more and treated and cured less and less. Mr. Key, Parliamentary Secretary to the Ministry of Health, followed with a forthright reply to the critics of the Bill who had so far spoken. He insisted that the needs of the public were paramount and must be put before the desires of the hospital authorities or the doctors. At the same time he claimed that the Bill gave the doctors a generous measure of professional self-government.

Mr. Willink (the Minister's predecessor in office) put as first and greatest of the disastrous changes made by the Government from those in the original White Paper the violation or abrogation of hospital trusts. He declared that during the 21 months when he, as Minister of Health, had the national health scheme under consideration, Mr. Bevan's over-simplified solution of wholesale nationalization of the hospitals was never suggested to him by anyone, political or professional. Mr. Willink criticized the proposed regional boards as covering such huge areas that the persons whom it was desired to have as members would have neither the time nor the inclination for so exacting a service as would be demanded.

Of the proposed control of the distribution of doctors, he said that the instrument had not yet been invented for measuring with any approximation to accuracy the extent to which areas were over-doctored or under-doctored. His fundamental objection to this part of the scheme lay in the payment of salaries, a provision which was intended to create a full-time salaried medical service as the Labour Party desired.

Mr. Greenwood, winding up the debate for the Government, declared that they stood by their policy on a medical service, as stated in 1943, and that the Bill was a "developing policy" which would march on to greater public service by the medical profession. On the subject of regulations which could be made under the Bill, he said that no one could possibly foresee all the future developments of the scheme and that there must be wide powers of regulation conferred upon the Minister.

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Questions

Colonial Services (Recruitment)

Mr. Skeffington asked the Secretary of State for the Colonies if adequate recruits are coming forward for the Colonial services; if they are being drawn from all strata of the population; and if the methods and conditions of recruitment are such as to give equal opportunity to all applicants.

Mr. George Hall: The number of candidates for the Colonial services greatly exceeds the number of vacancies in all those branches which do not require technical or professional qualifications. I should, however, like to have more applications from qualified doctors, barristers, statisticians, veterinarians, teachers and civil engineers. Recruits are being selected without regard to social background, and the methods and conditions of recruitment give equal opportunity to all applicants who have the necessary educational qualifications. Some 1,100 candidates have been selected for appointment since June 1st, 1945. Of these 740 have had university education and 370 no university education. As regards the schools of the total number of candidates selected, 346 have been to public schools, 510 to elementary and secondary schools, and the remainder have come mainly from overseas.

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Calves (Slaughtering)

Mr. Shurmer asked the Minister of Food if he is aware that young calves, too weak to travel, are being transported from collecting centres to the city abattoir, Birmingham, and are arriving in a distressed state; and what steps he is taking to stop this practice.

Sir B. Smith: The auctioneers in charge of collecting centres have instructions that weakly calves must not be included in consignments for distant slaugherhouses but must be sent without delay for slaughter at the nearest available Government slaughterhouse. I am satisfied that these instructions are carried out as a general rule, but I shall be glad to look into any particular case in which there is evidence of failure to do so.

Mr. Shurmer: Is my right hon. Friend aware that only a fortnight ago, of 23 calves sent from Stafford eight were too weak to walk, and out of 160 sent from Stafford 22 had to be slaughtered? This cruelty cannot go on.

Sir B. Smith: I agree. If I could have the particulars of those cases, I would very gladly look into them.

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Vivisection (Cancer Research)

Mr. Peter Freeman asked the Secretary of State for the Home Department the total number of experiments performed on living animals in connection with cancer research during 1945.

Mr. Ede: The figure for 1945 is not yet available. In 1944 the number was 21,571.

NOTES AND NEWS

Diary of Events

May 11th.—**Annual Meeting of the Association of Veterinary Inspectors, at Friends' House, Euston Road, N.W.1, 2 p.m.**

May 14th.—Conjoint Scientific Meeting of the Zoological Society of London and the British Ornithologists' Union, Regent's Park, N.W., 5 p.m.

May 15th.—**Spring Meeting of the Eastern Counties Division, N.V.M.A., at Colchester, 2.15 p.m.**

May 21st.—**R.C.V.S. Council Elections—Voting Papers issued.**

May 23rd.—Annual Meeting of the Dumfries and Galloway Division, N.V.M.A., at Carlisle, 2 p.m.

May 24th.—Special Meeting of the North Wales Division, N.V.M.A., at Bangor (School of Agriculture), 2 p.m.

May 28th.—R.C.V.S. Council Elections—Voting Papers to be returned.

June 1st.—Meeting of the Society of Women Veterinary Surgeons, at the Conway Hall, Red Lion Square, London, W.C.1, 2.30 p.m.

June 4th.—**R.C.V.S. Annual General Meeting.**

June 4th.—**R.C.V.S. Committee Meetings.**

June 4th.—Annual General Meeting, Victoria Veterinary Benevolent Fund, 10, Red Lion Square.

June 5th.—**R.C.V.S. Committee Meetings.**

June 6th.—**R.C.V.S. Committee and Council Meetings.**

June 6th.—Visit of the Central Veterinary Society to Northaw and the White City (see Notice).

The Following is the Provisional Programme for N.V.M.A. Council and Committee Meetings in June in Edinburgh

Wednesday, June 19th

11 a.m.—Finance and General Purposes Committee.
2.30 p.m.—Sub-committee on First Aid Handbook.

Thursday, June 20th

10 a.m.—Appointments Committee.
11.30 a.m.—Organising Committee.
2.15 p.m.—Joint Veterinary Officers, Public Health and Parliamentary Committee.

Friday, June 21st

11 a.m.—Council Meeting.

Would members wishing accommodation reserved in Edinburgh hotels notify the General Secretary, N.V.M.A., 36, Gordon Square, W.C.1, *without delay*, giving dates.

June 27th.—R.C.V.S. Written Examinations begin.

July 1st.—R.C.V.S. Oral and Practical Examinations commence.

Sept. 23rd-27th inclusive.—Annual Meeting and Conference of the National Veterinary Medical Association of Great Britain and Ireland, to be held in London.

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PERSONAL

We are glad to see that Mr. Henry Taylor, F.R.C.V.S., a retiring member, was re-elected for the Hayward's Heath Division in the recent election for the Urban Council of Cuckfield.

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Births.—Bassett.—On April 29th, 1946, at the Westminster Hospital, Shaftesbury, to Phil, wife of B. Donald Bassett, M.R.C.V.S., Llanreath House, Shaftesbury, Dorset—a brother for Jennifer (James Andrew).

Edwards.—On May 6th, 1946, to the wife of Clifford N. Edwards, B.V.Sc., M.R.C.V.S., University College of North Wales, Bangor, a son.

R.C.V.S. Prizes.—The Council of the Royal College of Veterinary Surgeons have awarded the FitzWygram Prize (for the highest aggregate of marks in all professional examinations) and the Williams Memorial Prize (for medicine and surgery) to Mr. George Duncan, M.R.C.V.S., Edinburgh, son of Mr. and Mrs. W. Duncan, Macdonald Crescent, Blairgowrie.

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Will.—Mr. G. H. Gibbings, F.R.C.V.S., of Tavistock, Devon, left £20,635 (net personalty, £20,526).

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R.C.V.S. OBITUARY

The Late Mr. John Brown, F.R.C.V.S.

Our readers will have learned with deep regret from our last issue of the death of Mr. John Brown, F.R.C.V.S., of Invergordon, one of the most prominent veterinary surgeons in the North of Scotland. In a tribute, the *Scottish Farmer* says of him: "Mr. Brown was recognized all over the North of Scotland as a highly skilled veterinarian, and in his day he attended to some of the best stock in the country. His work was of the most careful and painstaking character, and he was held in high regard by farmers and crofters all over the Northern Counties, where his professional services were in great demand. Mr. Brown, who was over 80 years of age, qualified M.R.C.V.S. in 1886. The following year he came to Ross-shire as assistant to the late Mr. George Gair, Conon Bridge. Later he went South for experience, and after three years in Cheshire he returned to Ross-shire in 1891. In 1892 he set up in business on his own account in Invergordon. During his long years in Invergordon he identified himself in all public and social life. He was highly respected and esteemed by everyone, and his stalwart figure will be much missed in Ross-shire. At the time of the first world war, Mr. Brown was sent to Canada by the Government to select and purchase horses for the Army."

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The Late Dr. S. J. Dickson

An Appreciation

Mr. H. Williams Smith sends us the following tribute to Dr. S. J. Dickson, whose death we recorded with much regret in our last issue.

The death of Sydney James Dickson so early in life comes as a great loss to the profession and to all who knew him. Qualifying at the Royal Veterinary College in December, 1939, he then proceeded to the Middlesex Hospital where he qualified in medicine. After posts of House Physician both in Birmingham and Richmond he joined the Emergency Public Health Laboratory Service in 1945 and was stationed at the Dunn School of Pathology, Oxford, under Professor G. S. Wilson. Here he started upon a career which was full of promise and one in which his veterinary training was of great value to him.

He will be remembered by all who met him at College for his quiet unassuming manner, and for the way in which he was ever ready to give a helping hand when needed. Meeting him a few months ago in Oxford, the enthusiastic manner in which he accomplished his work, and the eagerness with which he was ready to discuss veterinary matters makes one realize all the more forceably what a loss has been sustained by both the medical and veterinary professions.

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Much sympathy is felt with Mrs. J. W. H. Mutton, of Liskeard, Cornwall, in the death of her son, Charles Henry Mutton, aged 25 years, who passed away on March 21st and who had completed four years' successful studies at the Royal Veterinary College.

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VICTORIA VETERINARY BENEVOLENT FUND

In Memory of Dr. Fred Bullock

Fourth List.

Donations gratefully received from:—

Messrs. A. J. Baxter, F. Beckett, A. J. Beeson, A. Bullock, Colonel Glyn Lloyd, Mr. Ian E. Nicol, R.A.V.C. Officers' Club, Society of Women Veterinary Surgeons, Messrs. C. A. Wood and M. Dalby.

	£	s.	d.
Amounting to	32	12	0
Previous list	126	6	6
Total to date	£158	18	6

April 30th, 1946.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Swine Fever:

Bedfordshire.—Stratton Park Farm, Dunton Lane, Biggleswade, Beds. (May 6th).

Berks.—Slaughterhouse Yard, Hagbourne Road, Didcot, Berks. (May 4th).

Herefordshire.—Blacksmith's Shop, Stretton Grandison, Ledbury, Herefordshire (May 3rd).

Lincs. (Lindsey).—High Street, Hogsthorpe, Skegness, Lincs. (May 6th).

Midlothian.—Gogar Farm, Corstorphine, Edinburgh, Midlothian (Apr. 29th).

Northamptonshire.—Fir Tree Lane, Spratton, Northampton (May 6th).

Surrey.—Parsonage Farm, Witley, Godalming, Surrey (May 2nd); Orestan Farm, Orestan Lane, Effingham, Leatherhead, Surrey (May 6th).

Warwickshire.—Brook Lane Piggeries, Moreton Morrell, Warwick (May 6th).

Westlothian.—West Craigie Farm, South Queensferry, West Lothian (Apr. 29th).

Yorks., E.R.—West End, South Cave, Brough, Yorks. (Apr. 30th); Middle Farm, Skidby, Cottingham, Yorks. (May 4th); "Dunromin," Newfield Lane, South Cave, Brough, Yorks. (May 6th).

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PENICILLIN AVAILABLE SHORTLY AGAINST A DOCTOR'S PRESCRIPTION

The Government are about to make penicillin available against a doctor's prescription to anyone who needs it. Under a scheme of distribution now being worked out with the trade it is hoped that the drug will be on public sale at chemists' shops at the beginning of June. The price is still under discussion, but it is stated that it will be very cheap.

Mr. John Wilmot, the Minister of Supply, made this announcement at a Press conference at which he was accompanied by Sir Alexander Fleming, the discoverer of penicillin, Sir Howard Florey, who developed it in his laboratory at Oxford, and Sir Cecil Weir, who has been responsible at the Ministry of Supply for its development and production.

This step has been made possible by an encouraging increase in output from the two British factories, at Speke, Liverpool, and at Barnard Castle, in County Durham; they both use the deep culture method of production that has superseded the original surface culture plants. The factory at Speke is owned by the Ministry of Supply and run by the Distillers Company, Ltd., as its agents: at the Barnard Castle factory Glaxo, Ltd., employs its own plant in Government premises. Mr. Wilmot said that the two factories were now in full swing, and though they had been producing for only a few months were already well in front of their target figures. In the quality and scale of their production both plants would bear favourable comparison with those of any other country.

The United Kingdom production of penicillin to-day is nearly 1,000 times as much as in 1943. The average monthly production was 300 mega-units in 1943, 3,166 mega-units in 1944, and 26,000 mega-units last year. By the end of 1945 output was rising very fast, and in the months of March and April this year it was respectively 178,000 and over 260,000 mega-units. Further increases are expected.

Not only were we producing enough to meet our own estimated needs on the present basis, Mr. Wilmot said, but we should have some to spare for sending abroad to help other countries. Promising developments and experiments were also going forward to make penicillin available for veterinary purposes. With the increase in output the cost of production, originally high, had fallen, and when it came shortly into the chemists' shops the price would be less in shillings than the cost in pounds in the early days. There was no monopoly interest in the production of penicillin.

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B.M.A. AND THE HEALTH BILL

Committee Stage Amendments

Simultaneously with the Commons' sittings on Second Reading of the National Health Service Bill recorded in our Parliamentary columns, the British Medical Association held a two-day special representative meeting to consider the Bill. The Council of the Association gained overwhelming support for its decision to take any action to secure amendments of the Bill, for its refusal to accept the measure in its present form, and for the view that the scheme "will inevitably lead to a whole-time salaried service."

Dr. H. Guy Dain (Birmingham), Chairman of the Council, moving the adoption of the Council's report, said that of the 74 clauses of the Bill 24 gave the Minister of Health power to alter the regulations. They knew regulations might require alteration, but they did hold that the Minister should not have the whole power in his own hands. The Bill, Dr. Dain continued, would set up a most sinister position wherein the Minister would own all hospitals, and have the power of preventing any other hospital being set up outside the State organization. The fact that all trusts and hospital endowments would be swept away was another sinister aspect of the Bill, while the provision that practices should no longer be bought and sold made void every partnership now existing.

They expected their friends in the House of Commons to put their position forward but not that it would make the difference of a single vote. Indeed, they did not expect to influence Parliament at all, but they were not wasting their time. They were preparing amendments for the Committee stage of the Bill, and much depended on the support they got.

The meeting approved resolutions that in the new health service the family doctor should have direct access to the pathological and radiological services and provision be made for general practitioner beds either in special wards, blocks or hospitals, where doctors might undertake the full care of their patients; that all hospital boards of management should include representatives of the local general practitioners; and that there should be liaison between the local executive committee and the regional hospital boards. The conference demanded that remuneration should be by capitation fee only, special areas being dealt with in agreement with the profession.

A resolution that the buying and selling of practices was essential for the freedom of doctor and patient was carried by 229 votes to 13.

A proposal that the scheme should be rejected provoked a long and lively discussion at the second day's proceedings. The motion was put forward in the name of the Goole and Selby (Yorks.) division by Dr. T. Gardner, and recommended rejecting the proposed enactments in the Bill "in their entirety."

Dr. P. Inwald (City of London) moved as an amendment that the general framework of the Bill should be approved "as an important step towards the provision of a comprehensive service available to the whole community." Although the Bill was not accepted in its entirety by his division, as being in some respects hazy, they felt it was a basis on which a good medical service could be built.

Dr. G. M. Housden (Hereford), opposing Dr. Inwald's amendment, criticized the powers given to the Minister of Health, who had the right to chop and change the service at will. They should say they agreed to work the Bill only on certain conditions. The opponents of the Bill were not reactionary, for they realized improvements in the medical service were desirable, but the Bill made the Minister a veritable dictator.

The amendment was defeated by an overwhelming majority.

Dr. F. Gray, of London, said he believed that permanent officials of the Ministry of Health were the real enemy, and that Mr. Bevan wished to have a good service. He hoped it would be made clear that as soon as the Minister was willing to meet the Association they were willing to meet him and do their best to work out the best service for the nation.

A further amendment by Gateshead that, while agreeing on the need for improvement in and co-ordination of existing medical services, the Association disapproved of the methods proposed in the Health Bill to achieve these ends, was passed with only two dissentients.

At the Chairman's suggestion the Gateshead amendment was adopted as the substantive motion, and the motion put forward by Goole and Selby to reject the scheme was not put to the meeting.

Two resolutions which were remitted to the Council of the Association for consideration declared that:—

Before the Council recommends doctors to accept or refuse service under the new Bill a plebiscite of the whole profession should be taken; and

A referendum of the profession should be taken at once to determine the view of the profession before the Bill became law and that in the event of the referendum indicating strong opposition to the Bill the Government should be informed immediately with a view to it becoming confronted with the action likely to ensue.

Other resolutions passed were that:—

Doctors should be allowed to retire when they wished: midwifery and antenatal work should be associated with the general practitioner section of the service: apprehension was felt at the powers vested in the Minister of Health under the Bill: regret was felt that the Bill did not deal with the sale of patent medicines—the Minister should deal with the problem in another way: and everyone should be compulsorily insured for health and a complete medical service should be available to all who needed or desired it, provided that a State monopoly of medicine was avoided.

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At the Greenock abattoir pancreas, suprarenal and other ductless glands are now supplied for the manufacture of endocrine products. Last year 45,650 animals were slaughtered at this abattoir.

ROYAL VETERINARY COLLEGE

At the meeting of the Council which preceded the meeting of the Court of Governors of the Royal Veterinary College held on February 28th, Lt.-Colonel Sir Archibald Weigall, Bt., K.C.M.G., was unanimously elected as Chairman of Council for the ensuing 12 months in succession to Lt.-Colonel Sir Merrik Burrell, Bt. C.B.E., who has been Chairman for the past 18 years, but who regretted that he was unable to offer himself for re-election owing to the pressure of his other public activities. On appointment as Chairman, Sir Archibald Weigall resigned the Honorary Treasurership, to which Lt.-Colonel P. J. Simpson, D.S.O., F.R.C.V.S., was elected unanimously.

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Annual Report

The following report for the academic year ended September 30th, 1945, was presented to the annual meeting of the Court:—

We have very much regret in reporting the death of the Most Honourable The Marquess of Crewe, K.G., who was a Vice-President of the College for 33 years from 1911 to 1944.

Teaching

During the session 83 new students were admitted as compared with 71 in the session 1943-44. The total number of students at the beginning of the session was 317, the number for the previous year being 296.

At the examinations held by the Royal College of Veterinary Surgeons in December, 1944, 106 students presented themselves for examination and 72 or 68 per cent. passed, and at the examinations held in July, 1945, 256 students presented themselves and 202 or 79 per cent. passed. The percentages of passes in December, 1943, and July, 1944, were 68 per cent. and 79 per cent. respectively.

During the year under report 39 students obtained the Diploma of Membership of the Royal College of Veterinary Surgeons, as compared with 53 who qualified in the previous year.

The number of students preparing for the B.Sc. (Veterinary Science) degree shows a steady increase. Ninety-one were enrolled in October, 1944, in all years, compared with 76 in 1943, 68 in 1942, 58 in 1941 and 43 in 1940.

[The report shows an extended programme of research in progress both in the College and in the Research Institute of Animal Pathology, and proceeds as follows.]

The Hospital

At the Beaumont Animals' Hospital attendances at the clinic numbered 14,137 compared with 12,458 during the preceding year. The number of animals seen during the last quarter of the year, 4,566, was the highest for any quarter of any previous year.

Staff

Appointments

E. O. Longley, B.Sc., M.R.C.V.S., Lecturer Surgery (Obstetrics).
A. S. King, M.R.C.V.S., Demonstrator Anatomy.
P. Kiddle, M.R.C.V.S., Demonstrator Surgery.
D. E. Kidder, B.Sc., A.R.I.C., Demonstrator Chemistry.
W. Robertson, Demonstrator Chemistry.
Miss E. Barber, M.R.C.V.S., House Surgeon.

Resignations

A. Messervy, M.R.C.V.S., Lecturer Surgery.
C. W. Ottaway, F.R.C.V.S., Reader Anatomy.
J. Bolton, M.R.C.V.S., Lecturer Surgery.
Mrs. J. G. Wright, M.R.C.V.S., House Surgeon.

Finance

The chief features of financial importance in the year were that part of the Camden Town premises was released from requisition in the last quarter of the year, enabling the teaching of first and second year students to be resumed in London in October, 1945, and the taking of the West Grinstead Park Estate on a 99-year lease from September 29th, 1945. The former explains the decrease in revenue from requisitioned premises and the expenditure under the rehabilitation head. Both will be greater in the following years. The taking on lease of the West Grinstead Park Estate, though it will involve considerable expenditure later, has little financial effect for the present.

General College expenditure exceeded income, excluding Government grant, by £26,004, as compared with £22,407 in the preceding year. Revenue expenditure amounted to £46,346 compared with £42,416 in the previous year. The increase was due partly to rising establishment charges and partly to expenditure on rehabilitation. Income excluding Government grant showed little change. There was an increase of £1,028 in the income from students' fees, but rent of requisitioned premises fell by a like amount. Subscriptions were received from 347 regular subscribers.

The net cost of the Beaumont Animals' Hospital at Camden Town was £1,298 compared with £1,457 in the previous year.

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REDUCTION IN ANIMAL FEEDING-STUFFS

The further temporary rise in the extraction rate of flour to 90 per cent., announced on May 2nd, together with the other measures now being taken to save wheat and flour, will cause some consequential reduction in the supply of animal feeding-stuffs, states the Ministry of Agriculture. The immediate changes in the arrangements for feeding-stuffs rations in Great Britain during the period May to September are that basic rations for farm pigs and poultry will be reduced to one-twelfth of pre-war numbers in July, August and September. Smaller issues than last year will be made for autumn calving cows.

It is hoped that farmers will make every effort to maintain livestock production in this difficult period, both by increasing their own self-sufficiency in feeding-stuffs to the maximum extent through such measures as silage making, and also by making the greatest possible use of unrationed feeding-stuffs.

The University of Edinburgh has established a Chair of Dermatology, and is the first in Britain to elevate this study to that status. Dr. G. H. Percival has been appointed to the Chair, which has been made available through the generosity of Sir Robert M'Vittei Grant, who presented a fund in 1944 for that purpose.

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A plea was made at a meeting of Liskeard R.D.C., by Mr. H. S. Laity, that East Cornwall should be zoned for building up herds of tuberculosis-free cattle. the sea on the south and the River Tamar on the east making it a very suitable area for supplying healthy stocks.

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Woodbridge Horse Show, probably the only event of its kind to continue throughout the war, had a fine send-off for its peace-time series on Easter Monday. Not only was there the usual large turnout of Suffolk horses, but there were unexpectedly big classes for light horses. A feature of the Punch section was the success of animals sired by Monarch. Of eleven animals by that sire, six gained awards, three being firsts. It was encouraging to see, also, the number of exhibits sent by small farmers.—*Farmers' Weekly.*

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal views of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

Letters to the Editor should reach the Office not later than by the first post on Monday morning for insertion in following Saturday's issue.

Notice to Correspondents

The Editorial Committee regrets that, the paper supply situation having deteriorated, it has become necessary to ask correspondents again to accept a limitation on the length of letters submitted for publication. Accordingly, contributors to our Correspondence Columns are requested to note that, until further intimation is made, their communications must not exceed 350 words.

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TUBERCULIN TESTING

Sir,—I must admit that Mr. Searle's letter published in your issue of April 27th rather surprises me, for his experience of first official tests carried out by the Ministry appears to be very different from my own.

In the area of which I have had charge, namely, the south-east of Scotland, including Lanarkshire, where there are now close on 1,000 attested herds, it has for a long time been rare to find reactors at a first official test. Occasionally, of course, a reactor or two may occur but the great majority of such tests are clear and a breakdown at the subsequent herd test is also fortunately rare.

Mr. Searle states that he has been told that "the second test nearly always produces more drastic results than the first," but before a first official test can be carried out there must have been at least two clear tests and these, in most cases, have been preceded by others where reactors may have been found; so it is difficult to know what he means by the "second test."

If what is referred to is common in Durham the explanation may be due to the pre-attestation tests not being drastically enough interpreted, or it may be—and this is perhaps more likely—due to the procedure adopted in clearing up the herd. In this part of Scotland in herds where a large number of reactors are disclosed at the first private test, it has now become the practice to dispose of all the adult stock and gradually to build up a new herd with attested cattle after a thorough disinfection of the premises. It has been found to be uneconomic to clear out the reactors only and then retest those left as this usually leads to disappointment later on. It is quite different, however, with the young stock, amongst which reactors are usually few, for these may be kept in isolation and added to the herd afterwards, and in those herds where the preliminary tests disclose only a few reactors. In such cases the herd usually passes the official test satisfactorily.

Yours faithfully,

Edinburgh. D. S. Rabagliati.
May 1st, 1946.

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VETERINARY EDUCATION

The Lay Assistant Question

Sir,—Dr. McEwen, in his letter to the *Record* of April 20th, referred to a question of extreme importance to the profession.

No one will doubt that there is need for a wisely considered expansion in veterinary activities which should rightly be supervised by men with the highest educational standards obtainable. One need only instance the field of meat inspection. There are many others.

The important question which he raises in regard to the employment of lay assistants is one which will require very careful study in the immediate future. In view of the large-scale disease eradication schemes which will soon have to be carried out, entailing as they will a large amount of routine inoculations, it would seem to be an appropriate time for the R.C.V.S. and the N.V.M.A. to reconsider the above question.

It is perhaps not easy to visualize the scale on which these operations will be performed, but certainly one can imagine something revolutionary in the application of our science in this country.

Large-scale operations of this nature have been carried out in the colonies and other countries, and it has invariably been found expedient to employ lay inoculators under strict veterinary supervision. On the whole, I believe the system works well. It frees the qualified man for more interesting and more scientific work.

There is also another important issue involved. Unless the field of work available to the graduate is interesting and stimulating, the right type of man will certainly not be encouraged to enter our profession.

Yours faithfully,

Yew Tree Cottage, F. H. Manley.
Bassett Avenue, Southampton.
April 25th, 1946.

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A WHELPING AGE "RECORD"?

Sir,—Some interest seems to have been aroused by the recent correspondence on the subject of "record" weights of calves delivered by members; it therefore occurs to me that the following "record" might be of interest. On April 24th, 1946, I was called to attend a whelping case; one decomposing pup was removed from the bitch, a small working terrier. On enquiry as to her age, I was informed that she was 24 years old: we went into the matter carefully, and I am convinced there is no possibility of error. Pituitrin was administered and M. & B. 693 prescribed, followed by a general tonic. The bitch at once took over care of a pup of one of her innumerable daughters, and recovery appears to be complete.

She bred regularly until she was about 21.

Yours faithfully,

Chipping Norton, Oxon. Paul Crosfield.
April 28th, 1946.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange•	Sheep Scab	Swine Fever
April 1st to 15th, 1946 ...	8	—	—	—	21
Corresponding period in—					
1945 ...	3	4	1	—	54
1944 ...	12	4	—	2	29
1943 ...	17	—	1	7	29
Total Jan. 1st to April 15th, 1946 ...	37	20	4	34	192
Corresponding period in—					
1945 ...	37	63	4	33	331
1944 ...	75	19	5	58	181
1943 ...	108	10	5	92	168

Note.—The figures for the current year are approximate only.
• Excluding outbreaks in Army Horses.

Tuberculosis Order of 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period January 1st to March 31st, 1946, was 2,320.